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Elements of Orbit-Determination Theory: Textbook

A recent textbook presents a lucid, readable, comprehensive introduction to the problem of orbit determination. Although originally intended as a presentation on that subject, the text treats techniques that in fact are applicable to the solution of various optimization problems. As stated in the text's introduction, "The concepts are equally applicable to the fields of Optimal Control Theory, Optimization Theory, Statistical Estimation, Statistical Inference, and Curve Fitting."

A thorough knowledge of calculus and an acquaintance with matrix algebra and probability theory are useful prerequisites to a comprehensive understanding of the text; appendices are included, however, as refreshers in these areas.

The concepts are logically introduced, using a simplified model that contains most of the important features of practical problems but retains the possibility of analytical treatment. Refinements and complexities for computerized numerical solutions are avoided.

Specific topics include trajectory design and analysis, variational analysis of the trajectory, orbit determination, least-squares and weighted-least-

squares analysis of "overdetermined" orbits, maximum likelihood estimation, properties and relative merits of various statistical estimators, minimum variance, the combining of statistical estimates, mapping of covariance matrices, and dynamic filtering. The essential equivalence of several different approaches to various aspects of the problem is noted.

Note:

Requests for further information may be directed to:

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